

## The Meaning of $k$

**Quiz:** The meaning of  $k$ .

In the root beer cooling example the DE was:

$$\dot{x}(t) = k(T_{\text{ext}}(t) - x(t)).$$

What does it mean for  $k$  to be large?

**Choices:**

1. good insulation
2. bad insulation
3. nothing to do with insulation

**Answer:**

When the insulation is good,  $k$  is small; when the insulation is bad  $k$  is large.

When the insulation is perfect  $k$  is zero.

$k$  is a *coupling constant*; when it is zero, the temperature inside the cooler is decoupled from the temperature outside. In the construction industry a number like  $k$  is pasted on windows; it's called the U-value of the window.

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